

REMARKS

Request for Reconsideration

Applicants have carefully considered the matters raised in the Office Action, but remain of the opinion that patentable subject matter is present. Applicants respectfully request reconsideration of the Examiner's position based on the above amendments to the claims, and the following remarks.

Claim Status and Amendments

Claims 1, 4, 7, 8 and 9 are pending and claim 9 has been withdrawn.

Claim 1 has been amended by incorporating the limitations of claims 3, 6 and the boron limitation of claim 2. Thus claims 3 and 6 have been canceled, and claim 2 has been amended.

Claim 5 has been canceled based on the incorporation of claim 6 into claim 1.

Claims 1, 2, 4, 7 and 8 have also been amended to conform to the conventional US practice.

No new matter has been introduced by these amendments.

The Office Action

Claim Rejections – 35 USC § 112

Claims 1-8 had been rejected because of the transitional phrase "characterized in that". For independent claims 1 and 7, this phrase has been

changed to -- comprising --, and for the dependent claims 2, 4 and 8, it has been amended to use the transitional phase -- wherein --.

Double Patenting Rejections

This double patenting rejection is based on the co-pending application No. 11/722,813, which relates to a method for the production of p-type or n-type directionally solidified Czochralski silicon ingots from silicon feedstock initially containing between 0.2 ppma and 10 ppma boron and between 0.1 ppma and 10 ppma phosphorous.

Applicants have amended claim 1 to direct to the silicon feedstock containing between 0.3 and 5.0 ppma boron, between 0.1 and 10 ppma phosphorus, less than 150 ppma of metallic elements and less than 100 ppma carbon distributed in the material, which is distinguished from the silicon feedstock in the co-pending application. It is respectfully submitted that the double patenting rejection is now moot.

Prior Art Rejection

The Examiner rejected claims 1-6 under 35 USC § 103 based on Dosaj.

Applicants have amended claim 1 to further restrict the compositions of the silicon feedstock to between 0.3 and 5.0 ppma boron, between 0.1 and 10 ppma phosphorus, less than 150 ppma of metallic elements and less than 100 ppma carbon distributed in the material. This silicon feedstock defines over Dosaj for the following aspects:

a) Dosaj's boron content is much higher.

First of all, Applicants wish to point out that Dosaj uses the unit of "ppm", which is different from the unit of "ppma" in the present invention. When comparing the composition in the claims 1 and 4 in the present application with the composition in Dosaj, one should take into account that the content of boron and phosphorous in the present application is in ppma (Parts per Million by Atomic), while in Dosaj the boron and phosphorous is in ppmw (Parts per Million by Weight). For boron, "ppma" is equal to "ppmw/2.6". Therefore, the boron content of 4 ppmw in Example 7 of the table 3 in Dosaj is equal to 10.4 ppma, while boron content claimed is between 0.3 and 5.0 ppma. The boron content of the silicon feedstock in the amended Claims 1, 2 and 4 is thus substantially lower than the boron content disclosed by Dosaj.

b) Dosaj's metallic elements are is much higher.

It is known in the art that, in order to be able to produce silicon solar cells with high efficiency, it is necessary to have a silicon feedstock with a very low content of metallic impurities. From table 3 in Dosaj, it is evident that Example 7, which has the closest boron content, contains Fe in 460 ppmw, with equal to 168 ppma (1ppma=2.739ppmw for iron), and the example 3 and 6, which has the 2nd closest boron content, contain Fe in 402 ppma and 986 ppma. Claims 1, 2 and 4 have been amended to include the limitations of metallic elements in less than

150 ppma. It is clear that a single metallic impurity Fe in these examples are way beyond the lowest limit of all metallic impurities in the present invention.

c. Dosaj's carbon content is much higher

It is also known in the art that, a low carbon content is critical for producing silicon solar cells with high efficiency. The carbon content of the silicon in Dosaj is not stated. However, from lines 45-57 of column 5 of Dosaj, it is clear that, Dosaj's silicon is produced by using carbonaceous reduction agents and that no means for removing carbon from the silicon is disclosed. Claims 1 and 4 have been amended to include the limitations of carbon in less than 100 ppma. Silicon tapped directly from carbothermic smelting furnaces will have carbon content much higher than the carbon content of these claims in the present application.

It is therefore respectfully submitted that the subject matter in claims 1, 2 and 4 is patentable over Dosaj.

Allowable Subject Matter


The Examiner indicated that claims 7 and 8 contain allowable subject matters. Claim 7 is already in an independent form and claim 8 depends on claim 7. Applicants have amended claims 7 and 8 to remove the indefinite wordings. It is respectfully submitted that the present invention in Claims 7 and 8 direct to the allowable subject matters and therefore are patentable.

Conclusion

In view of the foregoing and the enclosed, it is respectfully submitted that the application is in condition for allowance and such action is respectfully requested. Should any further fees or extensions of time be necessary in order to maintain this Application in pending condition, appropriate requests are hereby made and authorization is given to debit Account # 02-2275.

Respectfully submitted,

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